**Greenhouse Project - Student Directions**

**Final presentation date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Goal:** You are a Botanist and entrepreneur. It is your job to grow flowers for Lowe’s Gardening Center as quickly as possible using your knowledge of plants and ecosystems. The “nursery company” with the healthiest plants will earn the contract for future Lowe’s business.

**Guidelines:**

\*Student will research abiotic and biotic factors that affect plant growth.

\*Using their research, students will make decisions about how to grow their plants and present their ideas to experts.

\*Students will build and maintain their greenhouse for several weeks to grow healthy plants.

\*Teams are given 8 seeds. They will observe the seeds using a hands lens and choose 5 to plant.

**How will the healthiest plants be determined?**

**Plant scoring guide**

\*Each team will submit their two best plants to the judges.

\*Each of the 2 plants will be measured in centimeters and added together. You will earn 1 point per centimeter of height.

\*Each team will earn 1 point for each leaf of the two plants.

\*Each team will earn 3 points for a bud/flower on the plant.

**Greenhouse Project – Parent Information**

Please read the student directions sheet above, so you will be informed about our latest project investigating factors that affect plant growth. Although the majority of work will be done in class, your child will occasionally have homework associated with overall project goals, such as researching a topic. Please check in with your child to ask how his/her project is going and what he/she is learning from the experience.

If you would like to donate supplies, here are a few things we need:

\*1 bag of seed starter mix \*2 bags of potting soil

\*2 small bags of aquarium gravel \*1 small bag of playground sand

\*50 paper cups \*25 small paper bathroom cups

\*1 roll of paper towels \*6 desk lamps with bulbs

\*6 timers for electrical outlets \*25 gallon size Ziploc bags

\*Various size measuring cups \*clear 2-L bottles (empty and clean)

\*eye droppers

\*Optional: Small prizes for winning team (4-5 students in a group)

I have read the Greenhouse Project – Student Directions and Parent information and have discussed it with my child.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Parent Signature Date

**Greenhouse Project – Company Information**

**Step one:** Decide on a company name with your group. Choose something clever! Write your company’s name in the space below.

**Step two:** Decide on norms for group discussions. Norms are similar to rules that each member agrees to. For example, “only one group member speaks at a time.” Think about norms that will help your group communicate well. Develop between 3-5 norms and record them in the space below.

#1\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

#2\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

#3\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

#4\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

#5\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Step three:** Using the list of group roles on the back of this page, decide what role each team member will have. Will you keep the same roles throughout the entire project or will they change? Write what your team decides below.

**Team Discussion Roles**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Role | Manager | Discussion Director | Facilitator | Trouble Shooter | Skeptic |
| Description | \*I read directions aloud for my team.  \*I keep my team group on task and following directions. | \*I ensure every team member has a chance to share what they learned from their research | \*I help decide who will do each part of the activity and how the work will be shared.  \*I keep track of time. | \*I help my team find the answer to any question we may have.  \*I help my team work together, instead of arguing. | \*I challenge my team members to justify their thinking and use details to support their ideas. |
| What it sounds like | \*The directions say…  \*Our next step is… | \*Jim, what did you learn from your website?  \*What do you think, Juana? | \*Bennett, will you research the first web site, while Trudy reviews the second website. | \*I think we can….to solve this problem.  \*Let’s remember to work together. | \*Can you explain…  \*Give an example of…  \*Why do you think… |

**Soil Research Handout**

|  |
| --- |
| **Important vocabulary:** soil, silt, clay, loam, sand, aeration, pH, nutrients, minerals, organic matter, abiotic factors, compost, nutrients, organic matter, ecosystem |
| What do I already know about this topic:  How does soil type affect plant growth?  How are the vocabulary words related to soil? |
| What did I learn from the teacher: |
| What did I learn from my research: |
| Title of Sources Used: |
| How will I use this information in my greenhouse project:  What type of soil will you use in your greenhouse? Why? Will you use any soil additives? |

**Light Research handout**

|  |
| --- |
| **Important vocabulary:** Quantity, intensity, quality, quantity, duration, photoperiod, photosynthesis, producer, carbon dioxide, oxygen, temperature, respiration, transpiration, radiation, artificial light, germinate |
| What do I already know about this topic:  How does light affect plant growth?  How are the vocabulary words related to light? |
| What did I learn from the teacher: |
| What did I learn from my research: |
| Title of Sources Used: |
| How will I use this information in my greenhouse project: |

**Water Research handout**

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| --- |
| **Important vocabulary:** irrigation, agriculture |
| What do I already know about this topic:  How does water affect plant growth?  How are the vocabulary words related to water? |
| What did I learn from the teacher: |
| What did I learn from my research: |
| Title of Sources Used: |
| How will I use this information in my greenhouse project: |

**Biotic Factors Research handout**

|  |
| --- |
| Important vocabulary: organism, herbivore, food chain, food web, consumer, carnivore, biological pest control, beneficial insects, interdependence, organism, predator, prey, biotic factors, constraint, decomposer |
| What do I already know about this topic:  How do other organisms affect plant growth?  How are the vocabulary words related to biotic factors? |
| What did I learn from the teacher: |
| What did I learn from my research: |
| Title of Sources Used: |
| How will I use this information in my greenhouse project:  How can I protect my plants from pests? How could I use decomposers? |

**Choices Handout**

**Directions:** After you research a topic, discuss the options listed under that topic. For example, on Day 1, after researching soil, you will do the “Choices about Soil” section on this sheet. Read over the options with your team. Discuss what you think is the best decision for your greenhouse based on what you have learned. Remember you are welcome to come up with your own ideas, but you must have been approved by the teacher before starting your greenhouse.

**Choices about Soil:**

A. Use 100% potting soil.

B. Use 100% soil from school playground.

C. Use layers of soil

D. Mix 50% school playground soil and 50% potting soil

E. Create your own option – must be teacher approved

**Choices about Light:**

Will you use artificial lighting? Yes or No? Why? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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If so, what kind of artificial lighting will you use?

A. Lamp set on a timer

B. Lamp a teammate will turn on.

C. Create your own option – must be teacher approved

How long will your photoperiod be? (How long will you use your artificial light?) \_\_\_\_\_\_\_\_\_\_\_

What kind of light will you use?

A. A white bulb

B. A colored bulb (red or green maybe) Your team is responsible for providing the colored bulb.

C. Create your own option – must be teacher approved

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Choices Handout Continued pg. 2**

**Choices about Water:**

How much and how often will I water my plant?

A. Water 5 days a week 1/8 cup per plant

B. Water 3 days a week 1/8 cup per plant

C. Water once a week ½ cup per plant

D. Create your own option – must be teacher approved

How am I going to water my plant?

A. With a dropper

B. With a small cup

C. “Bottom” watering

D. Create your own option – must be teacher approved

How will I water my plant?

A. With an eye dropper/pipet

B. With a small cup

C. Bottom watering

D. Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What will your water source be?

A. Tap water from the classroom sink

B. Bottled water

C. Rain water

D. Distilled water

E. Other: \_\_\_\_\_\_\_\_\_\_\_\_

**Choices Handout Continued pg. 3**

**Choices about Water Cont.:**

What will be the relative temperature of your water?

A. Approximately 10 degrees Celsius (cold)

B. Approximately 23 degrees Celsius (room temperature)

C. Approximately 35 degrees Celsius (warm)

D. Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Choices about Biotic Factors:**

How will I protect my plant from pests?

A. Close observation only

B. Covering our plants with a gallon size Ziploc bag

C. Covering our plants with 2 L bottles

D. Using biological pest control (such as ladybugs) – If you choose this option, it must be **pre-approved**. Think through how many beneficial insects you will need and how you will contain them, so they do not go to your neighbor’s greenhouse. **You must find a way to obtain the beneficial insects.**

E. Create your own option – must be teacher approved

Tell more details about your pest control choice. Why you made this choice and details about how you will design it (number of insects, etc.)?

How could you use biotic factors to provide nutrients to your soil?

A. Include earthworms

B. Include compost

C. Create your own option – must be teacher approved

**Other considerations:**

How will you get your plants to germinate?

A. Plant seeds directly in the soil.

B. Allow seeds to germinate in a wet paper towel before transplanting into soil.

C. Create your own option – must be teacher approved

**Here’s Our Plan**

**Directions: Use this page to plan your greenhouse. You will share this page with an agricultural expert. Be prepared to receive feedback on your ideas.**

1. Look over your research notes. Highlight one important thing you have learned about each of the factors we have studied (soil, water, light, and biotic factors). Share three things you’ve learned through your research with the expert by completing the sentence starters below.

A. Something I learned is…..

B. Something that surprised me was…

C.\_\_\_\_\_\_\_\_\_\_ reminds me of …..

2. Draw a blueprint of your greenhouse on graph paper. Label the parts of your greenhouse.

3. Review your “choices handout with your expert. Then, finish this statement: We decided to build our greenhouse in this manner, because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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4. Ask your expert to share his or her opinion about your project ideas. Use the following sentence starters as need:

\*What do you think about… \*Thank you for sharing about….

\*I wonder what would happen if… \*Can you explain more about….

Write down your questions here:

A.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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B. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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C. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Lastly, include a list of supplies you will need on the back of this paper. Be specific. Include the amounts.**

**Here’s My Feedback**

**Directions:** Guest, thank you for volunteering your time and sharing your expertise with us. You will be assigned to small groups who will share their greenhouse plan with you using their handouts. Use this sheet as a guideline for providing them with feedback. You may choose to leave this sheet with them, so they can refer to it later. Also, please review the words on the attached Greenhouse Project Glossary. If you are able to use any of these words into your conversation naturally, please do so. Remember this sheet is only a guide. You are the expert!

|  |  |  |  |
| --- | --- | --- | --- |
| **Blueprint feedback** | | | |
|  | | | |
| **Soil**  **Feedback** | **Water**  **Feedback** | **Light**  **Feedback** | **Biotic Factors Feedback** |
|  |  |  |  |
| **Other things to consider** | | | |

**Greenhouse Project Student Data Sheet pg. 1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Day** | **Day 1** | **Day 2** | **Day 3** | **Day 4** | **Day 5** |
| **Date** |  |  |  |  |  |
| **Height of plant?** | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm |
| **Sign of germination:** yes or no? |  |  |  |  |  |
| **# of leaves:** |  |  |  |  |  |
| **pH of soil**  (test 1-2 a week) |  |  |  |  |  |
| **Photo period**  Artificial light used? If so, how long? What type? |  |  |  |  |  |
| **Watered?**  If so, how much? |  |  |  |  |  |
| **Signs of pests?** |  |  |  |  |  |
| **Did your team make any changes?** |  |  |  |  |  |
| **Observations:**  (Include any signs of budding/disease  change in color, Etc.) |  |  |  |  |  |

**Greenhouse Project Student Data Sheet pg. 2**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Day** | **Day 6** | **Day 7** | **Day 8** | **Day 9** | **Day 10** |
| **Date** |  |  |  |  |  |
| **Height of plant?** | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm |
| **Sign of germination:** yes or no? |  |  |  |  |  |
| **# of leaves:** |  |  |  |  |  |
| **pH of soil**  (test 1-2 a week) |  |  |  |  |  |
| **Photo period**  Artificial light used? If so, how long? What type? |  |  |  |  |  |
| **Watered?**  If so, how much? |  |  |  |  |  |
| **Signs of pests?** |  |  |  |  |  |
| **Did your team make any changes?** |  |  |  |  |  |
| **Observations:**  (Include any signs of budding/disease  change in color, Etc.) |  |  |  |  |  |

**Greenhouse Project Student Data Sheet pg. 3**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Day** | **Day 11** | **Day 12** | **Day 13** | **Day 14** | **Day 15** |
| **Date** |  |  |  |  |  |
| **Height of plant?** | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm |
| **Sign of germination:** yes or no? |  |  |  |  |  |
| **# of leaves:** |  |  |  |  |  |
| **pH of soil**  (test 1-2 a week) |  |  |  |  |  |
| **Photo period**  Artificial light used? If so, how long? What type? |  |  |  |  |  |
| **Watered?**  If so, how much? |  |  |  |  |  |
| **Signs of pests?** |  |  |  |  |  |
| **Did your team make any changes?** |  |  |  |  |  |
| **Observations:**  (Include any signs of budding/disease  change in color, Etc.) |  |  |  |  |  |

**Greenhouse Project Student Data Sheet pg. 4**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Day** | **Day 16** | **Day 17** | **Day 18** | **Day 19** | **Day 20** |
| **Date** |  |  |  |  |  |
| **Height of plant?** | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm |
| **Sign of germination:** yes or no? |  |  |  |  |  |
| **# of leaves:** |  |  |  |  |  |
| **pH of soil**  (test 1-2 a week) |  |  |  |  |  |
| **Photo period**  Artificial light used? If so, how long? What type? |  |  |  |  |  |
| **Watered?**  If so, how much? |  |  |  |  |  |
| **Signs of pests?** |  |  |  |  |  |
| **Did your team make any changes?** |  |  |  |  |  |
| **Observations:**  (Include any signs of budding/disease  change in color, Etc.) |  |  |  |  |  |

**Greenhouse Project Student Data Sheet pg. 5**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Day** | **Day 21** | **Day 22** | **Day 23** | **Day 24** | **Day 25** |
| **Date** |  |  |  |  |  |
| **Height of plant?** | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm | \_\_\_\_\_\_cm |
| **Sign of germination:** yes or no? |  |  |  |  |  |
| **# of leaves:** |  |  |  |  |  |
| **pH of soil**  (test 1-2 a week) |  |  |  |  |  |
| **Photo period**  Artificial light used? If so, how long? What type? |  |  |  |  |  |
| **Watered?**  If so, how much? |  |  |  |  |  |
| **Signs of pests?** |  |  |  |  |  |
| **Did your team make any changes?** |  |  |  |  |  |
| **Observations:**  (Include any signs of budding/disease  change in color, Etc.) |  |  |  |  |  |

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Greenhouse Project Student Reflection**

**Circle the choice that best describes your thoughts:**

1. This project was effective in helping me learn about the factors that affect plant growth

Strongly agree Agree Neutral Disagree Strongly disagree

2. This project was effective in helping me learn how organisms interact within their ecosystem.

Strongly agree Agree Neutral Disagree Strongly disagree

3. This project was effective in helping me learn about various careers in agricultural/science.

Strongly agree Agree Neutral Disagree Strongly disagree

4. What were the major challenges your group had with this project?

5. What is the most important thing you learned in this project?

6. If you could do this project over again, what would you do differently?

7. What was your favorite part of this project? Why?

8. How could your teacher change this project to make it better next time?

**Rubric of evidence of 5th grade Science learning goals**

Level 4: Student exceeds grade level expectations of this goal.

Level 3: Student demonstrates at-grade level expectations of this goal.

Level 2: Student is working towards this goal.

Level 1: Student did not complete this goal.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Learning goals** | **Evidence** | **1** | **2** | **3** | **4** |
| **NC Essential Standards** |  |  |  |  |  |
| **5.L.2.2 Classify the organisms** in an ecosystem according to the function they serve: **producers, consumers, or decomposers** (biotic factors). | Day 5: Biotic Factor research notes & discussion  -food chain in the  What I learned from the teacher section  -use of vocabulary |  |  |  |  |
| **5.L.2.3 Infer the effects** that may result from the **interconnected relationship of plants and animals** to their ecosystem. | Day 5: Biotic Factor research notes & discussion  -evidence of cause/effect & predicting what might happen between organisms in the ecosystem  Presentation to experts  -evidence of biotic factors and justification for decisions based on scientific reasoning |  |  |  |  |
| **Next Generation Science Standards** |  |  |  |  |  |
| **5.LS.1.1 Support an argument that plants get the materials they need** for growth chiefly from **air and water**. | Day 2-4 Soil, light, and water notes and discussion  -use of vocabulary  -justification of greenhouse choices based on understanding of factors affecting plant growth |  |  |  |  |
| **5.ES.3.1 Obtain and combine information** about ways individual communities use science ideas to **protect the Earth’s resources and environment.** | Days 2-5 notes and discussion and presentation to agricultural experts  -- justification of greenhouse choices based on understanding of factors affecting plant growth  --referring to research |  |  |  |  |
| **3-5.ETS.1.2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.** | Days 2-5 notes/discussion and presentation to agricultural experts  -- justification of greenhouse choices  --consider other group members and expert feedback; discuss pros and cons; compare ideas |  |  |  |  |

**Rubric of evidence of 6th grade Science learning goals**

Level 4: Student exceeds grade level expectations of this goal.

Level 3: Student demonstrates at-grade level expectations of this goal.

Level 2: Student is working towards this goal.

Level 1: Student did not complete this goal.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Learning goals** | **Evidence** | **1** | **2** | **3** | **4** |
| **NC Essential Standards** |  |  |  |  |  |
| **6.L.1.2 Explain the significance of the processes of photosynthesis, respiration, and transpiration** to the survival of green plants. | Day 3 research notes and discussion  --Look for key vocabulary (photosynthesis, respiration, transpiration)  --Ask specific questions related to key ideas |  |  |  |  |
| **6.L.2.1 Summarize how energy** derived from the sun is used by **plants to produce sugars (photosynthesis)** and is transferred within **food chains and food webs** from **producers to consumers and decomposers.** | Day 3 & 5 research notes and discussion  --Look for specific use of vocabulary (photosynthesis, food chain, consumer, etc.)  --Ask specific questions related to key ideas  --Look for food chain notes on day 5 section “What I Learned From the Teacher” |  |  |  |  |
| **6.L.2.3 Summarize how the abiotic factors** (such as temperature, water, sunlight, and soil quality) of biomes (freshwater, marine, forest, grasslands, desert, tundra) **affect the ability of organisms to grow, survive, and/or create their own food** through photosynthesis. | Day 2-4 research notes and discussion  --Look for key vocabulary (see Greenhouse Project Glossary list)  --Listen for justification of greenhouse choices based on scientific understanding of abiotic factors |  |  |  |  |
| **Next Generation Science Standards** |  |  |  |  |  |
| MS.LS.1.6 Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. | Day 3 research notes and discussion  --Look for key vocabulary (photosynthesis, respiration, transpiration)  --Ask specific questions related to key ideas |  |  |  |  |
| MS.LS.2.2 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. | Day 5: Biotic Factor research notes & discussion  -evidence of cause/effect & predicting what might happen between organisms in the ecosystem  Presentation to experts  -evidence of biotic factors and justification for decisions based on scientific reasoning |  |  |  |  |
| MS.ETS.1.2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. | Days 2-5 notes and discussion and presentation to agricultural experts  -- justification of greenhouse choices based on understanding of factors affecting plant growth  --consider other group members and expert feedback; discuss pros and cons; compare ideas |  |  |  |  |

**Rubric of evidence of 5th grade ELA learning goals**

Level 4: Student exceeds grade level expectations of this goal.

Level 3: Student demonstrates at-grade level expectations of this goal.

Level 2: Student is working towards this goal.

Level 1: Student did not complete this goal.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning goals** | **1** | **2** | **3** | **4** |
| **Research goals** |  |  |  |  |
| **RI.5.1 Quote accurately from a text** when explaining what the text says explicitly and when drawing inferences. |  |  |  |  |
| **RI.5.4 Determine the meaning** of general academic and **domain-specific words** and phrases in a text relevant to a grade 5 topic or subject area. |  |  |  |  |
| **RI.5.7 Draw on information from multiple print or digital sources**, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. |  |  |  |  |
| **RI.5.10 Read and comprehend information texts**, including history/social studies, science, and technical texts, at the high end of the grades 4-5 text complexity band independently and proficiently. |  |  |  |  |
| **RI.5.2 Determine two of more main ideas of a text** and explain how they are supported by key details; summarize the text. |  |  |  |  |
| **W.5.7 Conduct short research projects** that use several sources to build knowledge through investigation of difference aspects of a topic. |  |  |  |  |
| **Group discussion goals** |  |  |  |  |
| **RI.5.9 Integrate information from several texts on the same topic** in order to write or speak about the subject knowledgeably. |  |  |  |  |
| **[SL.5.1](http://www.corestandards.org/ELA-Literacy/SL/5/1/) Engage effectively in a range of collaborative discussions** (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly. |  |  |  |  |
| **[SL.5.1.A](http://www.corestandards.org/ELA-Literacy/SL/5/1/a/) Come to discussions prepared, having read or studied required material;** explicitly draw on that preparation and other information known about the topic to explore ideas under discussion. |  |  |  |  |
| **[SL.5.1.B](http://www.corestandards.org/ELA-Literacy/SL/5/1/b/) Follow agreed-upon rules for discussions and carry out assigned roles.** |  |  |  |  |
| [**SL.5.1.C**](http://www.corestandards.org/ELA-Literacy/SL/5/1/c/) **Pose and respond to specific questions** by making comments that contribute to the discussion and elaborate on the remarks of others. |  |  |  |  |
| **[SL.5.1.D](http://www.corestandards.org/ELA-Literacy/SL/5/1/d/) Review the key ideas expressed and draw conclusions** in light of information and knowledge gained from the discussions. |  |  |  |  |
| **[SL.5.2](http://www.corestandards.org/ELA-Literacy/SL/5/2/) Summarize** a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally. |  |  |  |  |
| **Agricultural expert presentation goals** |  |  |  |  |
| **--Multimedia** |  |  |  |  |
| **[SL.5.5](http://www.corestandards.org/ELA-Literacy/SL/5/5/) Include multimedia components** (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. |  |  |  |  |
| **5.W.1B Provide logically ordered reasons that are supported by facts and details.** |  |  |  |  |
| **W.5.2A Introduce a topic clearly**, provide a general observation and focus, and group related information logically; **include formatting (headings), illustrations, and multimedia when useful to aiding comprehension.** |  |  |  |  |
| **W.2.B Develop the topic with facts,** definitions, concrete details, quotations, or other information and examples related to the topic. |  |  |  |  |
| **W.5.8 Recall relevant information** from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and **provide a list of sources**. |  |  |  |  |
| **W.2.D Use precise language and domain-specific vocabulary** to inform about or explain the topic. |  |  |  |  |
| **W.5.6 With some guidance and support from adults, use technology,** including the Internet, to produce and **publish writing** as well as to interact and **collaborate with others**. |  |  |  |  |
| **--Speaking goals** |  |  |  |  |
| **[SL.5.4](http://www.corestandards.org/ELA-Literacy/SL/5/4/) Report on a topic** or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace. |  |  |  |  |
| **[SL.5.6](http://www.corestandards.org/ELA-Literacy/SL/5/6/) Adapt speech** to a variety of contexts and tasks, using **formal English** when appropriate to task and situation |  |  |  |  |

**Rubric of evidence of 6th grade ELA learning goals**

Level 4: Student exceeds grade level expectations of this goal.

Level 3: Student demonstrates at-grade level expectations of this goal.

Level 2: Student is working towards this goal.

Level 1: Student did not complete this goal.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning goal** | **1** | **2** | **3** | **4** |
| **Research goals** |  |  |  |  |
| **[W.6.8](http://www.corestandards.org/ELA-Literacy/W/6/8/) Gather relevant information from multiple print and digital sources;** assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. |  |  |  |  |
| **RI.6.1 Cite textual evidence to support analysis** of what the text says explicitly as well as inferences drawn. |  |  |  |  |
| **RI.6.2 Determine a central idea of a text** and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments. |  |  |  |  |
| **RI.6.4 Determine the meaning of words and phrases and they are used in a text**, including figurative, connotative, and technical meanings. |  |  |  |  |
| **RI.6.7 Integrate information presented in different media or formats** (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic. |  |  |  |  |
| **RI.6.10 Read and comprehend literary nonfiction** in the grades 6-8 text complexity band proficiently, with scaffolding as needed at the high end of the range. |  |  |  |  |
| **[W.6.7](http://www.corestandards.org/ELA-Literacy/W/6/7/) Conduct short research** projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate. |  |  |  |  |
| **[W.6.9](http://www.corestandards.org/ELA-Literacy/W/6/9/) Draw evidence** from literary or informational texts to support analysis, reflection, and research |  |  |  |  |
| **Discussion goals** |  |  |  |  |
| **[SL.6.1](http://www.corestandards.org/ELA-Literacy/SL/6/1/) Engage effectively in a range of collaborative discussions** (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly. |  |  |  |  |
| **[6.1.A](http://www.corestandards.org/ELA-Literacy/SL/6/1/a/)** **Come to discussions prepared,** having read or studied required material; explicitly draw on that preparation by **referring to evidence on the topic, text, or issue** to probe and reflect on ideas under discussion. |  |  |  |  |
| **[SL.6.1.B](http://www.corestandards.org/ELA-Literacy/SL/6/1/b/) Follow rules for collegial discussions**, set specific goals and deadlines, and define individual roles as needed. |  |  |  |  |
| **[SL.6.1.C](http://www.corestandards.org/ELA-Literacy/SL/6/1/c/) Pose and respond to specific questions with elaboration and detail** by making comments that contribute to the topic, text, or issue under discussion. |  |  |  |  |
| **[SL.6.2](http://www.corestandards.org/ELA-Literacy/SL/6/2/) Interpret information presented in diverse media and formats** (e.g., visually, quantitatively, orally) **and explain** how it contributes to a topic, text, or issue under study. |  |  |  |  |
| **Agricultural Experts Presentation goals** |  |  |  |  |
| **--Speaking goals** |  |  |  |  |
| **[SL.6.4](http://www.corestandards.org/ELA-Literacy/SL/6/4/) Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation**. |  |  |  |  |
| **--Multimedia/writing goals** |  |  |  |  |
| **[SL.6.5](http://www.corestandards.org/ELA-Literacy/SL/6/5/) Include multimedia components** (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information. |  |  |  |  |
| **SL.6.6 Adapt speech to a variety of contexts** and tasks, demonstrating command of **formal English** when indicated or appropriate. |  |  |  |  |
| **W.6.1.A Introduce claim**(s) and organize the reasons and evidence **clearly**. |  |  |  |  |
| **[W.6.1.B](http://www.corestandards.org/ELA-Literacy/W/6/1/b/) Support claim(s) with clear reasons and relevant evidence**, using credible sources and demonstrating an understanding of the topic or text. |  |  |  |  |
| **W.6.2.B Develop the topic** with relevant facts, definitions, concrete details, quotations, or other information and examples. |  |  |  |  |
| **W.6.2.D Use precise language and domain-specific vocabulary** to inform about or explain the topic. |  |  |  |  |
| **[W.6.2.E](http://www.corestandards.org/ELA-Literacy/W/6/2/e/) Establish and maintain a formal style.** |  |  |  |  |
| **[W.6.4](http://www.corestandards.org/ELA-Literacy/W/6/4/) Produce clear and coherent writing** in which the development, organization, and style are **appropriate to task, purpose, and audience.** |  |  |  |  |
| **W.6.6 Use technology, including the Internet, to publish writing** as well as to interact and **collaborate with others**. |  |  |  |  |

**Collecting & Analyzing Greenhouse Data Using Line Plots**

Learning goal: Common Core Math 5.MD.2

**Directions**: The teacher will list all of the heights of each groups’ plants on the board. Record each height to the nearest ½ centimeter in the chart below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Group 1 | Group 2 | Group 3 | Group 4 | Group 5 | Group 6 |
|  |  |  |  |  |  |

Use the line below and colored pencils to create a line plot to show each groups’ data. Choose a color for each group and shade it in the box above as a key. Then, use the same color to put an “x” for each of their data points on the line plot.

Analysis Questions:

\*Use the data on the line plot above to answer the following questions.

1. Which group has the tallest two plants? What was the sum of their two tallest plants’ height in centimeters?

2. Did your groups’ plants each grow about the same height? Why do you think this is?

3. Did the classes’ plants grow about the same height overall or were their differences? Why do you think this is?

**Collecting & Analyzing Greenhouse Data Using Mean, Median, Mode, and Range**

Learning goal: Common Core Math 6.SP.B.5

**Directions**: The teacher will list all of the heights of each groups’ plants on the board. Record each height to the nearest ½ centimeter in the chart below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Group 1 | Group 2 | Group 3 | Group 4 | Group 5 | Group 6 |
|  |  |  |  |  |  |

Analysis Questions:

\*Use the data on the line plot above to answer the following questions.

1. How many observations are reported in the greenhouse project (include every groups’ data)?

2. What unit is the data set based on? (Hint: They are measurements of height.)

3. Calculate the mean, median, and range for each group and record it in the chart below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Group 1 | Group 2 | Group 3 | Group 4 | Group 5 | Group 6 |
| Mean |  |  |  |  |  |  |
| Median |  |  |  |  |  |  |
| Mode |  |  |  |  |  |  |
| Range |  |  |  |  |  |  |

3. What patterns or observations do you notice about the data?

4. Which method of analyzing data do you think is the most accurate way to determine which group was most successful and why?